

REMARKS

Claims 7-13 and 15-31 are present in this application. Claims 1-6 and 14 have been canceled. Claims 7, 10, 13, 15, 16, 17, and 29 are independent. Claims 30 and 31 are new.

The following remarks address further arguments presented in the Advisory Action dated April 10, 2006 with regard to the rejections made in the Final Office Action dated December 28, 2005.

Claim Objection

Claim 28 has been objected to for minor informalities. Claim 28 had been amended to depend from claim 27 as recommended in the Office Action. Accordingly, Applicants request that the objection be withdrawn.

Claim Rejection – 35 U.S.C. § 103; Imura, Szeliski

Claims 1, 2, 4, 5, 14-16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,929,971 (Imura) in view of U.S. Patent 6,097,854 (Szeliski). Claims 1, 2, 4, 5, and 14 had been canceled. Claims 15 and 16 had been re-written into independent form. Applicants traverse this rejection.

Embodiments related to claim 15 (e.g., second disclosed embodiment) are directed to mobile equipment including, among other things

a pickup device picking up an image of a subject;

a parallax information portion determining parallax information of said subject;

a three dimensional image creation portion creating a three dimensional image by applying said parallax information to said image; and

a display unit displaying said three dimensional image,

wherein said parallax information portion calculates said parallax information based on the brightness of the image.

For example, in a second embodiment of the present invention, the processor 105 of the mobile phone can divide a 2D image picked up through a camera 206 into a plurality of blocks and detect each block's brightness. Parallax information can be determined for each block such that a brighter block will have a more forward position in a display of a 3D image on main screen 203. Thus, the second embodiment results in a more accurate determination of parallax information. (present specification at page 12, lines 10-22).

The Office Action indicates that a section of Imura at column 2, lines 41-45 teaches the claimed calculation of parallax information based on the brightness of the image.

The Advisory Action presents an additional argument that Imura's teaching of detecting parallax information based on the positional relationship between the photographing lens and the view finder, focal length of the photographing lens and object distance would include intensity of light, or brightness of light. The Advisory Action states, as justification of this assumption, that "a lens depends upon incoming (reflected) light" and the photographing lens and parallax detection of Imura most likely would not work properly if there were insufficient light. Applicants disagree. Possibly there has been a confusion between focusing (movement of the lens) and brightness related adjustments, such as movement of the iris.

Applicants note that although focusing of a lens could probably not be carried out in the absence of light, the amount of lens movement in carrying out the focusing operation is a function of distance to an object, and is not a function of either intensity of reflected light or image brightness. Furthermore, the amount of lens movement that occurs in focusing does not provide an indication of intensity of light or brightness, as alleged. On the other hand, an F-number, for example, may provide an indication of the amount of brightness. However, Imura does not teach "F-number" as a detected parameter among detected parallax information. Subsequently, Applicants submit that detecting the amount of lens movement in the focusing operation would not provide information on the brightness of an object, and much less the intensity of reflected light that would be necessary to create a three dimensional image.

Unlike the present invention, Imura is concerned with determining an amount of parallax between the image as seen through a view finder and the image actually picked up by the camera. In Imura, the parallax information that is detected is not based on the picked up image (post-image capture), but is based on information associated with picking up the image (pre-image capture). Thus, Imura does not teach or suggest obtaining brightness of the picked up image.

Furthermore, the distance to an object, i.e., amount of lens movement, constitutes a single point and would not be sufficient information to enable creation of a three dimensional image. In the case of the present claimed invention, brightness of the image picked up by the pickup device is used in determining parallax information. Imura seeks only to detect an amount of parallax that has occurred in picking up an image, and does not at all teach determination of parallax

information suitable for creation of a three dimensional image based on the image that has been picked up.

Embodiments related to claim 16 (e.g., third disclosed embodiment) include calculation of parallax information based on intensity of light reflected from the subject.

The Office Action alleges that objects from a further distance may appear to be less intense than closer objects especially when a camera flash is used. Applicants submit that this statement is not supported by the plain teachings of Imura.

As in the case for claim 15, Imura clearly relies on the amount of lens movement for detection of parallax information. As mentioned above, the amount of lens movement does not provide information on the intensity of reflected light. Thus, Applicants submit that Imura fails to teach or suggest at least the claimed “wherein said parallax information portion calculates said parallax information based on the intensity of light reflected from the subject.”

Therefore, Applicants submit that Imura and Szeliski, either alone or in combination, fail to teach each and every element of claims 15 or 16. Accordingly, the rejection fails to establish *prima facie* obviousness for claims 15 and 16.

Applicants request that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 103; Imura, Szeliski, Aoki

Claims 3 and 6-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Imura in view of Szeliski and further in view of U.S. Application Publication 2002/0054032 (Aoki). Claims 3 and 6 have been canceled. Applicants traverse this rejection.

Embodiments related to claim 7 (e.g., fourth disclosed embodiment) are directed to a mobile equipment including, among other things,

a single pickup device picking up an image of a subject;

a parallax information portion determining parallax information of the subject based on a distance between human eyes;

a three dimensional image creation portion creating a three dimensional image by applying the parallax information to the image; and

a display unit displaying the three dimensional image,

wherein the three dimensional image creation portion cuts a human face out of the image picked up, to obtain a face image and provides the face image with the parallax information.

Similarly, embodiments related to claim 13 (e.g., fourth disclosed embodiment) are directed to a three dimensional conversion program product causing a computer to execute a three dimensional conversion process comprising the steps of:

inputting a two dimensional image;

cutting a human face image out of the two dimensional image to obtain a face image;

determining parallax information of the face image based on a distance between human eyes;

creating a three dimensional image by applying the parallax information to the face image; and

outputting the three dimensional image.

The Office Action alleges that Aoki teaches the claimed limitation of “cuts a human face out” at paragraph 0039. Paragraph 0039 states that in order for a target image such as an image of a user’s face to fully fill an image frame, the face is enlarged, reduced, or tracked. “Then, only the face image is cut out and that image is compressed and transmitted.”

Among the additional arguments provided with the Advisory Action, it is stated that Szeliski would benefit from the parallax detection capabilities of Imura because Imura teaches “detecting parallax information.”

Applicants submit that this statement is inconsistent with the context of the claim, which pertains to “determining” parallax information rather than detecting parallax information. Imura teaches detection of parallax information in order to correct reproduction of a photographed image. The parallax results from a displacement between the field viewed through the viewfinder and the actual photographed field based on the lens. Imura subsequently teaches trimming of the picked up image based on this displacement. Szeliski teaches correction for large parallax or distortion (see sections “Local Alignment” and “Environment/Texture Mapping”). Aoki is relied on for teaching cutting out an image of a face.

Applicants submit that the parallax image relating to the image picked up by a camera relative to an image viewed through a viewfinder of Imura is not applicable to a portion of an image such as a human face. Imura specifically teaches application of a trimming process to the actually photographed image based on parallax information in order to provide a reproduced image as actually seen by the viewfinder. A human face as part of the image would be the same in each field of view. In other words, if a face image were to be cut out using the process of

Aoki, the parallax information of Imura would no longer be applicable (i.e., the parallax information indicating the area of the image to be trimmed would no longer be applicable to a cut out human face, since the human face is no longer the original picked up image to be trimmed). Thus, Applicants submit that even if Aoki, Imura and Szeliski were to be combined in the manner alleged in the Office Action, the combination would not teach at least the claimed three dimensional image creation portion that cuts a human face out of the image picked up to obtain a face image and provide the face image with the parallax information.

Furthermore, the parallax image in Imura is not the same parallax information as the parallax that is corrected in Szeliski, and neither of those parallax information is of the type of information necessary to create a three-dimensional image from a single picked up image. In order clarify this distinction, claims 7, 10 and 13 have been amended to indicate that the parallax information is calculated based on the distance between human eyes. Applicants submit that neither Imura nor Szeliski teach or suggest at least this claimed feature.

For at least these reasons, Applicants submit that Imura, Szeliski, and Aoki, either alone or in combination, fail to teach each and every claimed element of claims 7 and 13.

Embodiments related to claim 10 (e.g., fourth disclosed embodiment) are directed to a mobile equipment including, among other things

a single pickup device picking up an image of a subject;

a parallax information portion determining parallax information of the subject based on a distance between human eyes;

a three dimensional image creation portion creating a three dimensional image by applying the parallax information to the image; and

a display unit displaying the three dimensional image,

wherein the three dimensional image creation portion selects a particular subject from said image picked up, to obtain an image of the subject and provides said image of the subject and an image included in the image picked up other than the particular subject with different parallax information, respectively.

The Office Action alleges that Imura teaches the claimed “selects a particular subject from said image ... included in said image ... other than said particular subject with different parallax information.” Applicants disagree. Imura merely teaches trimming of an image for proper image reproduction. Imura does not teach selection of a particular subject as alleged in the Office Action.

The Office Action alleges that Aoki’s teaching in figures 7A and 7B of extracting a face from an initial image where background objects are included in the initial image, implies that the background objects have different parallax information from the face and thus would not be extracted (Office Action at paragraph bridging pages 5-6). Applicants submit that this statement is not supported by the plain teachings of Aoki. Aoki does not disclose parallax information applied to either background objects or the face.

Thus, Applicants submit that Aoki fails to teach or suggest at least the claimed “wherein the three dimensional image creation portion selects a particular subject from said image picked up, to obtain an image of the subject and provides said image of the subject and an image

included in the image picked up other than the particular subject with different parallax information, respectively.”

For at least this additional reason, Applicants submit that Imura, Szeliski, and Aoki, either alone or in combination, fail to teach each and every claimed element of claim 10.

Accordingly, the rejection fails to establish *prima facie* obviousness for claims 7, 10, and 13, and respective dependent claims.

Applicants request that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 103; Szeliski, Yokoi

Claims 17, 23, and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Szeliski in view of U.S. Patent 5,682,171 (Yokoi). Applicants traverse this rejection.

Embodiments related to claim 17 (e.g., first disclosed embodiment) are directed to a mobile equipment including, among other things

a pickup device picking up a two dimensional image data of a subject;

a three dimensional image creation portion obtaining display data for three dimensional display, the display data including image data for a right eye and for a left eye, wherein the three dimensional image creation portion includes,

a first data process means for generating three dimensional data derived from the two dimensional data; and

a second data process means for converting the three dimensional data into the image data for the right eye and the image data for the left eye; and

a display unit displaying an image for the three dimensional display based on the display data.

Embodiments related to claim 29 are directed to a corresponding method.

With respect to claims 17 and 29, the Office Action relies on the combination of Szeliski and Yokoi. The Office Action relies on Szeliski for teaching the claimed “first data processing means” for generating three dimensional data from the two dimensional data, “second data processing means” for converting the three dimensional data into the image data for the right eye and the image data for the left eye, and “display unit” displaying an image for the three dimensional display.

The Office Action states that Szeliski does not explicitly teach the claimed “three dimensional image creation portion” obtaining display data for three dimensional display. The Office Action instead relies on Yokoi for teaching this limitation. In particular, the Office Action states that Yokoi’s teaching of “converting planar image data for one picture in the source image data into the first and second display” teaches the claimed limitation.

The Advisory Action presents an additional argument that using the data from the 3D graphics viewer of Szeliski and putting it into the system shown in Figure 25 of Yokoi suggests the claimed second data processing means for converting the three dimensional data into the image data for the right eye and the image data for the left eye. Applicants disagree.

Applicants submit that neither reference teaches conversion of three-dimensional data into image data for a right eye and image data for a left eye. Contrary to the statement in the Advisory Action, Yokoi does not teach or suggest conversion of three-dimensional data into

image data for a right eye and image data for a left eye. At most, Yokoi teaches a technique for conversion of a 2D image into image data for the right eye and image data for the left eye. Szeliski may teach generation of respective 3D images from each 2D image. Furthermore, the stated advantage that Yokoi suggests the combination with Szeliski by teaching “low cost” only implies that one of ordinary skill would seek the low cost option of conversion of a 2D image into an image for a right eye and an image for a left eye of Yokoi as a low cost option for producing stereoscopic images. Yokoi’s low cost approach does not apply to converting three-dimensional image data into image data for a right eye and image data for a left eye.

Thus, Applicants submit that neither Szeliski nor Yokoi teach or suggest at least the claimed feature of “a second data process means for converting the three dimensional data into the image data for the right eye and the image data for the left eye.”

Accordingly, for at least these reasons, Applicants submit that the rejection fails to establish *prima facie* obviousness for claims 17 and 29, as well as dependent claim 23.

It is noted that the Advisory Action incorrectly indicates that claim 23 is an independent claim.

Further with respect to dependent claim 23, claim 23 recites an additional feature for the invention of claim 17 of a memory for storing a face geometry model, as well as that the three dimensional image creation portion further includes an extraction means for extracting a human face image out of two dimensional image data, “wherein said first data process means generates the three dimensional data from the human face image data based on the face geometry model.”

The Advisory Action presents a hypothetical that is not disclosed in any of the references in order to demonstrate the claimed invention. For example, the Advisory Action states that, “A user would use such photos and the system of Szeliski to utilize these images to extract human face data and incorporate one or more faces into an appropriate 3d model stored in memory 270.” This and other statements are not present in Szeliski. Applicants submit that the teaching of generation of three dimensional data from human face image data based on a face geometry model in the context of a mobile equipment is knowledge gleaned only from applicants’ own disclosure. Applicants submit that such statements made in the Advisory Action including knowledge gleaned from applicants’ disclosure constitutes impermissible hindsight. In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Accordingly, at least for this additional reason, Applicants submit that the rejection fails to establish *prima facie* obviousness for claim 23.

Applicants request that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 103; Szeliski, Yokoi, Taniguchi

Claims 18-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Szeliski, Yokoi and further in view of U.S. Patent 6,940,646 (Taniguchi). Applicants traverse this rejection.

Taniguchi teaches a stereoscopic image display.

Claims 18-20 depend from claim 17. Applicants submit that at least for the reasons above for claim 17, the rejection fails to establish *prima facie* obviousness for claims 18-20, as well.

Applicants request that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 103; Szeliski, Yokoi, Imura

Claims 21 and 24-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Szeliski, Yokoi, and Imura. Applicants traverse this rejection.

Claims 21 and 24-26 depend from claim 17. Applicants submit that at least for the reasons above for claim 17, the rejection fails to establish *prima facie* obviousness for claims 21 and 24-26, as well.

In addition, with respect to claim 26 the Office Action indicates that Imura's lamp 114 teaches the claimed "radiation unit." Contrary to the claimed invention, Imura's lamp 114 (Fig. 12) is disclosed as being part of a printing apparatus, and is not for illuminating a subject with light.

Applicants request that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 103; Szeliski, Yokoi, Aoki

Claims 22, 27, and 28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Szeliski, Yokoi, and Aoki. Applicants traverse this rejection.

Claims 22, 27, and 28 depend from claim 17. Applicants submit that at least for the reasons above for claim 17, the rejection fails to establish *prima facie* obviousness for claims 22, 27 and 28, as well.

Applicants request that the rejection be reconsidered and withdrawn.

New Claims

New dependent claims 30 and 31 have been added. Applicants submit that claims 30 and 31 are allowable at least for the reasons above for claims 15 and 16.

Conclusion

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert W. Downs (Reg. No. 48,222) at the telephone number of (703) 205-8000, to conduct an interview in an effort to expedite prosecution in connection with the present application.

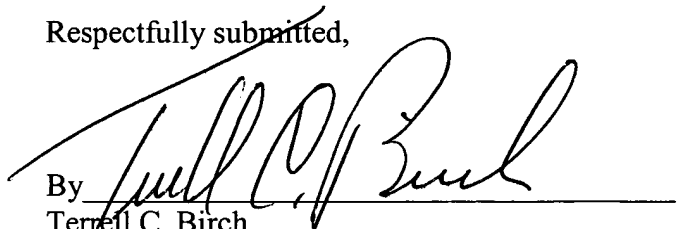
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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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